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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/830,164	04/21/2004	Srikanth R. Avadhanam	MS167378.02/40062.128USC1	8149

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EXAMINER	
CHANNAVAJJALA, SRIRAMA T	
ART UNIT	**PAPER NUMBER**
2166	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/830,164	AVADHANAM ET AL.	
	Examiner	Art Unit	
	Srirama Channavajjala	2166	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This application is a continuation of US Application No. ***09/838,691*** filed on ***4/19/2001*** is now US Patent No. ***6,778,977***

2. Claims 1-28 are pending in this application.

3. Examiner acknowledges applicant's amendment filed on 4/10/2007.

4. Claims 1,12-14,18,20,24,27 have been amended 4/10/2007.

Drawings

5. Drawings filed on ***4/21/2004*** is acceptable for examination purpose.

Information Disclosure Statement

6. The information disclosure statement filed on ***12/21/2004 and 11/17/2006*** is in compliance with the provisions of 37 CFR 1.97, and has been considered and a copy is enclosed with this Office Action.

Specification

7. In view of applicant's amendment [4/10/2007], the objection to the specification as set forth in the previous office action is hereby withdrawn.

35 USC § 112

8. In view of applicant's response at page 12-14, the rejection under 35 USC 112 as set forth in the previous office action is hereby withdrawn.

Double Patenting

9. In view of applicant's filed "terminal disclaimer" on 4/10/2007, the rejection under "double patent" as set forth in the previous office action is hereby withdrawn.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

10. ***Claims 1-28 are rejected under 35 U.S.C. 101 because invention is directed to non-statutory subject matter.***

As set forth in MPEP 2106(II)A:

Identify and understand Any Practical Application Asserted for the Invention. The claimed invention as a whole must accomplish a practical application. That is, it must produce a "useful, concrete and tangible result." State Street, 149 F.3d at 1373, 47USPQ2d at 1601-02. The purpose of this requirement is to limit patent protection to inventions that possess a certain level of "real world" value, as opposed to subject matter that represents nothing more than an idea or concept, or is simply a starting

point for future investigation or research (Brenner v. Manson, 383 U.S. 519, 528-36, 148 USPQ 689, 693-96); In re Ziegler, 992, F.2d 1197, 1200-03, 26 USPQ2d 1600,1603-06 (Fed. Cir. 1993)). Accordingly, a complete disclosure should contain some indication of the ***practical application*** *for the claimed invention, i.e., why the applicant believes the claimed invention is useful.*

Apart from the utility requirement of 35 U.S.C. 101, usefulness under the patent eligibility standard requires significant functionality to be present to satisfy the useful result aspect of the practical application requirement. See Arrhythmia, 958 F.2d at 1057, 22 USPQ2d at 1036. Merely claiming nonfunctional descriptive material ***stored in a computer-readable medium does not make the invention eligible for patenting****. For example, a claim directed to a word processing* ***file stored on a disk may satisfy the utility*** *requirement of 35 U.S.C. 101 since the information stored may have some* ***"real world"*** *value. However, the mere fact that the claim may satisfy the utility requirement of 35 U.S.C. 101* ***does not mean that a useful result is achieved under the practical application requirement. The claimed invention as a whole must produce a "useful, concrete and tangible" result to have a practical application****.*

11. In view of Applicant's disclosure, specification page 5, line 20-23, page 8, line 19-23, page 9, line 1-4, the medium is not limited to tangible embodiments, instead being defined as including both e.g., Memory, removable storage, non-removable storage, RAM,ROM,EEPROM, flash memory, CD-ROM, DVD, optical storage, magnetic cassettes, magnetic tape, magnetic disk storage) and e.g., at page 5, line 20-23 including ***propagated signal*** on a ***carrier*** readable by a computing system and

encoding a computer program of instructions for executing a computer process; page 8, line 20-23 [for example] computer readable instructions, data structures, program modules or other data in a modulated data signal such as a ***carrier wave*** or other transport mechanism...). As such, the claim is not limited to statutory subject matter and is therefore non-statutory.

Hence, claims 12-13 depend from claim 1, 11 are rejected under 35 USC 101 as "non-statutory" because computer program product[s] that lack storage on a suitable computer-readable medium are not able to realize any functionality and are thus not statutory

claim 12 is directed to "***A computer program product readable by a computer and encoding instructions for executing the method recited in claim 1***

claim 13 is directed to "***A computer program product readable by a computer and encoding instructions for executing the method recited in claim 11***"

finally, "***CARRIER WAVES , propagated signal*** on a ***carrier ARE NOT STATUTORY***"

REMARKS: applicant is required to amend the specification page 5, line 20-23, page 8, line 19-23, page 9, line 1-4 appropriately

For "General Analysis for Determining Patent-Eligible Subject Matter", see 101 Interim Guidelines as indicated below:

<<http://www.uspto.gov/web/offices/pac/dapp/ogsheet.html>>

see MPEP 8th edition, Rev 5, Aug 2006

No new matter should be entered

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. Claims 1- 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta et al. [hereafter Gupta], US Patent No. 6438562 filed on August 24,1999 in view of Blank et al. [hereafter Blank], US Patent No. 5,842,208 published on Nov 24, 1998.

16. As to claim 1, 12, 18,20,27, Gupta teaches a system which including 'a method of creating an index for a database table of records [col 2, line 21-23, col 3, line 45-47 fig 2-3], database table corresponds to fig 2, table 200; index corresponds to fig 3, element 300 the method occurring in a computer environment having a plurality of processing units [fig 1, fig 7] wherein each processing unit has access to the table [col 2, line 41-44], Gupta specifically teaches relational storage where relational databases store data records in indexed tables as detailed in fig 2-3, plurality of processing units corresponds to Gupta's fig 1 and fig 7 ;

determining partition delimiters, each partition delimiter separating the table into non-overlapping partitions of records [col 14, line 35-38, fig 7], each partition delimiter separating the table into non-overlapping partitions of records corresponds to Gupta's fig 7, partitions A 161, B162, and C 163; 'each partition dedicated to one processing unit for index creation' [col 14, line 44-50, line 54-56], each partition dedicated to one processing unit for index creation corresponds to Gupta's index fig 7, element 711,712,713, and 714 ;

accessing the table records in parallel, wherein each processing unit accesses each of the records [col 8, line 1-13], Gupta teaches data manipulation operations

specifically each data slave accessed to perform data manipulation i.e., processing data records and updating the index maintenance records as detailed in col 8, line 1-13;

filtering the accessed records in parallel, wherein each processing unit determines which records to keep '[col 7, line 45-51; col 12, line 21-27, col 13, line 37-39], Gupta specifically teaches accessing index ID value that identifies the specific index associated with the data records to be changed as detailed in col 12, line 21-27

independently creating a plurality of sub-indexes, wherein at least two sub-indexes are created by different processing units' [col 3, line 45-52, col 12, line 58-63, line 64-67, col 13, line 18-25, col 14, line 54-61], Gupta specifically teaches each index record corresponds to a row [see fig 6], further index maintenance records indicate changes that need to be made to indexes in response to changes that are made to the table [col 12, line 58-63],that corresponds to independently creating indexes or sub-indexes, further to keep separate the changes to the two indexes, the index maintained records are modified to include the index ID as detailed in fig 6, element 611. It is also noted that sub-indexes are part of B-tree element 300 because B-tree is arranged in hierarchical structure, further each node or branch in the B-tree structure associated with index key [col 3, line 45-53];

'storing the final index' [col 20, line 57-60], Gupta specifically teaches storing index records related to global index particularly sorted version of the index maintenance records as detailed in col 20, line 57-60.

It is however, noted that Gupta does not specifically teach 'merging the sub-indexes together to create, a final index related to the table', although Gupta specifically teaches coordinating an update of a global index of an indexed table and updates the global index using the current index maintenance record [col 7, line 41-42], further Gupta also suggests index maintenance records using "data manipulation operations among parallel data manipulation slaves for example fig 5, element 510, the data manipulation operations including updating col 14, line 46-47] , inserting, deleting [col 13, line 28] sorting [col 16, line 36-37]and like

On the other hand, Blank et al. disclosed 'merging the sub-indexes together to create, a final index related to the table' col 3, line 57-67, col 4, line 1-2], Blank specifically teaches index built system that supports multiple scan program performed in parallel by multiple processors against multiple partitions [see fig 3], further, in the processing or recover/built index system, multiple merge programs for example fig 4, element 112a-b are performed that merges all the key/rid values. Finally, an index built program 114 is performed to built final index element 116as detailed in fig 1.

It would have been obvious to one of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Blank et al. into parallel index maintenance of Gupta et al. because, both Gupta and Blank are directed to "multiple processors and multiple partitions of database tables [see Gupta fig 1, fig 7; Blank: fig 1, element 102 corresponds to multiple processors, element 120 corresponds to partition],

both Gupta and Blank also teaches "indexing and index key [see Gupta: fig 2, col 13, line 26-40; Blank: col 2, line 42-48] and both Gupta and Blank specifically suggests "sort" operation [see Gupta: col 16, line 31-33; Blank: col 3, line 18-19] and both are from same field of endeavor.

One of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Blank et al. into parallel index maintenance of Gupta et al. because that would have allowed user's of Gupta et al. .to use "sort program that executing in parallel receive the san streams for each "partition to create sort stream [col 3, line 5-9], while merge program that merges the sort stream received from the sort program to create a merge stream [col 3, line 10-15], further merge program built "final indexes" col 3, line 67, col 4, line 1-2] bring the advantages of "high performance recover/build index system that reduces the amount of time that takes to built index in multiple processors [col 3, line 25-27], furthermore, piping the data between the sort and merge programs improves performance of the system as suggested by Blank et al. [col 3, line 28-30].

17. As to claim 2, Gupta disclosed 'wherein the act of creating the sub-indexes [col 3, line 45-53], sub-indexes are part of B-tree element 300 because B-tree is arranged in hierarchical structure, further each node or branch in the B-tree structure associated with index key [col 3, line 45-53] further comprises sorting the records and generating a data structure based on the sorted records [col 8, line 18-26].

18. As to claim 3, Gupta disclosed wherein the data structure is a B-Tree data structure [col 3,line 45-448, col 4, line 13-14], B-structure data structure corresponds to Gupta's B-tree fig 3, element 300.

19. As to claim 4, Gupta disclosed 'wherein the data structure has multiple levels. [fig 3, element 300, col 4, line 13-15], B-tree data structure is a hierarchical having root node, leaf nodes

20. As to claim 5, Gupta disclosed 'wherein the data structure is a clustered index' [col 14, line 23-26], Gupta specifically teaches index will be clustered based on index maintenance records

21. As to claim 6, Gupta disclosed 'further comprising gathering sub-index statistical information and stitching sub-index statistical information' [col 15, line 35-50, fig 5], Gupta specifically suggests sample of "S" records of the index to give good statistical representation of the population based on number of available nodes as detailed in [col 15, line 35-47].

22. As to claim 7, Gupta disclosed 'wherein the method is initiated by an index creation manager module' [fig 1, element 170,fig 7, element 170], global index corresponds to index module.

23. As to claim 8, Gupta disclosed 'wherein the method is initiated by a query manager in response to a supplied query' [fig 13, col 20, line 66-67, col 21, line 1]

24. As to claim 9, Gupta disclosed 'wherein the method is initiated automatically in response to a modification to the table' [col 5, line 38-44, col 18, line 53-57, fig 11].

25. As to claim 10, Gupta disclosed 'wherein the act of determining partition delimiters comprises: sampling the table records to determine an approximate distribution of the values in the key field' [col 15, line 35-47, line 66-67, col 16, line 1-13], Gupta specifically teaches sampling of "S" records of the index maintenance records to compute good statistical representation of the population chosen for "S" records, also suggested that every fifteenth record is sampled during the PDML operations, it is also noted that "ranges are defined by reading the "key values" associated with each multiple of S*/N from the sorted records as detailed in fig 8, particularly "distributing work based on index key value ranges" [see col 15]; further it is noted that Gupta also specifically teaches "partitioned" database tables as detailed in fig 1 and fig 7, creating a histogram based on the sampled information; and evaluating the histogram to determine the partition delimiters [col 15, line 39-40].

As best understood by the examiner, a histogram can be constructed by segmenting the range of the data into equal sized, particularly, ranges that are defined in col 15, line 66-67, moreover, it is common knowledge that statistics analyzing,

viewing the data in a variety of ways, one possible way is "histogram", "bar graphs", "pie-charts" , further, "histograms are sometimes referred to "frequency distribution" which is an integral part of Gupta's "statistical representation of records [col 15, line 39-40]

26. As to claim 11, 13, Gupta disclosed 'determining a processor goal value based on the number of processors in the computer system' [col 4, line 52-55]; determining a least common multiple value based on the processor goal value [col 6, line 55-59]; 'determining whether the histogram information may be substantially evenly split into the least common multiple value number of partitions' [col 6, line 59-65,col 13, line 57-61]; if so, creating the partition delimiters based on the least common multiple value' [col 13, line 66-67]; and if not, adjusting the processor goal to determine a new least common multiple value to determine partition delimiters' [col 14, line 3-8].

27. As to claim 14, Gupta teaches a system which including 'a system for database table index creation for a database table [fig 1, col 4, line 57-61], database table corresponds to fig 1, database table], the database table stored in memory and comprising a plurality of records [fig 1-2, element 151-153], the system comprising:

a plurality of processing units that respectively accesses the database table in parallel, [fig 1, col 4, line 43-48] the respective processing units accesses each of the records [col 8, line 1-13], Gupta teaches data manipulation operations specifically each

data slave accessed to perform data manipulation i.e., processing data records and updating the index maintenance records as detailed in col 8, line 1-13;

and 'filters the accessed records to determine which records to keep'[col 7, line 45-51; col 12, line 21-27, col 13, line 37-39], Gupta specifically teaches accessing index ID value that identifies the specific index associated with the data records to be changed as detailed in col 12, line 21-27;

and wherein each of the respective processing units creates a sub-index of database table records resulting in a plurality of sub-indexes; [col 3, line 45-52, col 12, line 58-63, line 64-67, col 13, line 18-25, col 14, line 54-61], Gupta specifically teaches each index record corresponds to a row [see fig 6], further index maintenance records indicate changes that need to be made to indexes in response to changes that are made to the table [col 12, line 58-63],that corresponds to independently creating indexes or sub-indexes, further to keep separate the changes to the two indexes, the index maintained records are modified to include the index ID as detailed in fig 6, element 611. It is also noted that sub-indexes are part of B-tree element 300 because B-tree is arranged in hierarchical structure, further each node or branch in the B-tree structure associated with index key [col 3, line 45-53]

'a store tool that stores the final database table index' [col 20, line 53-62].

It is however, noted that Gupta et al. does not specifically teach 'merge tool that merges the plurality of sub-indices into a final database table index', although Gupta specifically teaches coordinating an update of a global index of an indexed table and updates the global index using the current index maintenance record [col 7, line 41-42],

further Gupta also suggests index maintenance records using "data manipulation operations among parallel data manipulation slaves for example fig 5, element 510, the data manipulation operations including updating col 14, line 46-47] , inserting, deleting [col 13, line 28] sorting [col 16, line 36-37]

On the other hand, Blank et al. disclosed 'merge tool that merges the plurality of sub-indices into a final database table index' col 3, line 57-67, col 4, line 1-2], Blank specifically teaches index built system that supports multiple scan program performed in parallel by multiple processors against multiple partitions [see fig 3], further, in the processing or recover/built index system, multiple merge programs for example fig 4, element 112a-b are performed that merges all the key/rid values. Finally, an index built program 114 is performed to built final index element 116as detailed in fig 1.

It would have been obvious to one of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Blank et al. into parallel index maintenance of Gupta et al. because, both Gupta and Blank are directed to "multiple processors and multiple partitions of database tables [see Gupta fig 1, fig 7; Blank: fig 1, element 102 corresponds to multiple processors, element 120 corresponds to partition], both Gupta and Blank also teaches "indexing and index key [see Gupta: fig 2, col 13, line 26-40; Blank: col 2, line 42-48] and both Gupta and Blank specifically suggests "sort" operation [see Gupta: col 16, line 31-33; Blank: col 3, line 18-19] and both are from same field of endeavor.

One of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Blank et al. into parallel index maintenance of Gupta et al. because that would have allowed user's of Gupta et al. .to use "sort program that executing in parallel receive the san streams for each "partition to create sort stream [col 3, line 5-9], while merge program that merges the sort stream received from the sort program to create a merge stream [col 3, line 10-15], further merge program built "final indexes" col 3, line 67, col 4, line 1-2] bring the advantages of "high performance recover/build index system that reduces the amount of time that takes to built index in multiple processors [col 3, line 25-27], furthermore, piping the data between the sort and merge programs improves performance of the system as suggested by Blank et al. [col 3, line 28-30],

28. As to claim 15, Gupta disclosed 'a filter module that filters the accessed records and selectively predetermined records"[col 7, line 45-51; col 12, line 21-27, col 13, line 37-39], Gupta specifically teaches accessing index ID value that identifies the specific index associated with the data records to be changed as detailed in col 12, line 21-27, col 20, line 66-67, col 21, line 1-4, fig 13] ; and a sorting module that sorts records kept by the filter module into a sub-index' [col 16, line 31-33]. On the other hand, Blank disclosed 'a scanning module that scans the database table' [fig 1, element 108,fig 2, element 200], Blank specifically teaches both scan and sort operations as detailed in fig 2.

29. As to claim 16, Blank disclosed 'scanning module, filter module and sorting module, for each processing unit, operate concurrently' [fig 1-2,fig 4,col 3, line 55-67].

30. As to claim 17, Gupta disclosed 'a sampling module for sampling the database table and a partition module for dividing the records into substantially equal quantities related to the number of processing units' [col 15, line 35-47].

31. As to claim 19, Gupta disclosed 'upon determining that the accessed table record is not associated with the at least one partition dedicated to the first processing unit, passing the accessed record to the second processing unit for index creation' [col 16, line 34-46].

32. As to claim 21, 25, Gupta disclosed wherein the act of allocating portions of the disk allocates a predetermined number of blocks, the predetermined number of blocks is determined during the determination of the partition delimiters' [col 11, line 61-67, col 12,line 1-7].

33. As to claim 22, 26, Gupta disclosed 'wherein the allocation of portions of the disk comprises: maintaining a cache of allocated pages and allocating pages for each partition in the cache for each processing unit' [col 3, line 6-15, fig 1]

retrieving a pre-determined number of database pages upon request,col 3, line 15-18]

wherein the number of pages to allocate upon each request is determined by the size of the cache [col 3, line 19-26].

34. As to claim 23, Gupta disclosed 'wherein the cache has a size depending on the size of the index being built and the number of currently available free pages in the system' [col 6, line 24-33].

35. As to claim 24, Gupta teaches a system which including 'In a computer system having a plurality of processors' [fig 1, element 111,112,113,114], an index creation system for creating an index of information for a table of data records' [fig 1, element 170]

'a sampling module that samples the table of data records to determine sub index delimiters' [[col 15, line 35-47, line 66-67, col 16, line 1-13], Gupta specifically teaches sampling of "S" records of the index maintenance records to compute good statistical representation of the population chosen for "S" records, also suggested that every fifteenth record is sampled during the PDML operations, it is also noted that "ranges are defined by reading the "key values" associated with each multiple of S*/N from the sorted records as detailed in fig 8, particularly "distributing work based on index key value ranges" [see col 15]; further it is noted that Gupta also specifically teaches "partitioned" database tables as detailed in fig 1 and fig 7

' two or more index creation modules, each index creation module

associated with a processor, each index creation module creates a sub-index' [col 3, line 37-65, col 4, line 13-24];

an access module that accesses data records from the table of data records [col 8, line 1-13], Gupta teaches data manipulation operations specifically each data slave accessed to perform data manipulation i.e., processing data records and updating the index maintenance records as detailed in col 8, line 1-13;

'a filter module that filters data records according the sub-index delimiters to keep only relevant data records' '[col 7, line 45-51; col 12, line 21-27, col 13, line 37-39], Gupta specifically teaches accessing index ID value that identifies the specific index associated with the data records to be changed as detailed in col 12, line 21-27

'a sorting module that sorts the relevant data records into a sub-index' [col 3, line 45-53], sub-indexes are part of B-tree element 300 because B-tree is arranged in hierarchical structure, further each node or branch in the B-tree structure associated with index key [col 3, line 45-53] further comprises sorting the records and generating a data structure based on the sorted records [col 8, line 18-26].

'a store module that stores the final index' [col 20, line 56-60].

It is however noted that Gupta does not specifically teach 'a merge module that merges the sub-indexes into a final index', although Gupta specifically teaches coordinating an update of a global index of an indexed table and updates the global index using the current index maintenance record [col 7, line 41-42], further Gupta also

suggests index maintenance records using "data manipulation operations among parallel data manipulation slaves for example fig 5, element 510, the data manipulation operations including updating col 14, line 46-47] , inserting, deleting [col 13, line 28] sorting [col 16, line 36-37].

On the other hand, Blank et al. disclosed 'a merge module that merges the sub-indexes into a final index" col 3, line 57-67, col 4, line 1-2], Blank specifically teaches index built system that supports multiple scan program performed in parallel by multiple processors against multiple partitions [see fig 3], further, in the processing or recover/built index system, multiple merge programs for example fig 4, element 112a-b are performed that merges all the key/rid values. Finally, an index built program 114 is performed to built final index element 116as detailed in fig 1.

It would have been obvious to one of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Blank et al. into parallel index maintenance of Gupta et al. because, both Gupta and Blank are directed to "multiple processors and multiple partitions of database tables [see Gupta fig 1, fig 7; Blank: fig 1, element 102 corresponds to multiple processors, element 120 corresponds to partition], both Gupta and Blank also teaches "indexing and index key [see Gupta: fig 2, col 13, line 26-40; Blank: col 2, line 42-48] and both Gupta and Blank specifically suggests "sort" operation [see Gupta: col 16, line 31-33; Blank: col 3, line 18-19] and both are from same field of endeavor.

One of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Blank et al. into parallel index maintenance of Gupta et al. because that would have allowed user's of Gupta et al. .to use "sort program that executing in parallel receive the san streams for each "partition to create sort stream [col 3, line 5-9], while merge program that merges the sort stream received from the sort program to create a merge stream [col 3, line 10-15], further merge program built "final indexes" col 3, line 67, col 4, line 1-2] bring the advantages of "high performance recover/build index system that reduces the amount of time that takes to built index in multiple processors [col 3, line 25-27], furthermore, piping the data between the sort and merge programs improves performance of the system as suggested by Blank et al. [col 3, line 28-30],

36. As to claim 28, Gupta disclosed 'allocating memory for storing parts of each sub-index in contiguous memory blocks' [col 3, line 10-18].

Response to Arguments

37. Applicant's arguments filed on 4/10/2007 with respect to claims 1-28 have been fully considered but they are not persuasive, for examiner's response, see discussion below:

a) At page 15, claim 1, applicant argues that "neither Gupta nor Blank, alone or in combination, teach independently creating a plurality of sub-indexes ...."

b) At page 16, claim 1, applicant argues that "Gupta clearly does not teach or suggest independently creating a plurality of sub-indexes"

As to the argument [a-b], as best understood by the examiner, firstly, Gupta is directed to parallel index maintenance, more specifically, in a typical database system environment creating not only rows, column in a table, but also particularly creating "indexes" in order to improving the efficiency of data retrieval [see col 3, line 29-31], secondly, Gupta specifically teaches assigning "key" to the index i.e., assigning specific index IDs in a "B-tree" structure [see fig 3, col 3, line 45-56], thirdly, Gupta specifically teaches each index record corresponds to a row [see fig 6, col 12, line 28-36], i.e., index maintenance records where each index entry identified by "key value", further index maintenance records indicate changes that need to be made to indexes in response to changes that are made to the table [col 12, line 58-63] that corresponds to independently creating not only indexes having identified with index IDs, but also

creating and maintaining "sub-indexes" and related records. It is further noted that such indexes created and maintained to keep updates to the indexes as detailed in fig 6, element 611. It is also noted that sub-indexes are integral part of "B-tree" data structure particularly fig 3, element 300 because B-tree is arranged in hierarchical structure where each node or branch in the B-tree structure associated with specific index key as detailed in col 3, line 45-53.

c) At page 15, claim 1, applicant argues that "no mention is made of creating actual indexes".

As to the above argument [c], examiner disagree with the applicant because, firstly, Gupta specifically teaches "B-tree" data structure where specific "index key" are created, in other words, it is "B-tree index" arranged in a hierarchical structure associated with a "range of index key values" as detailed in col 3, line 45-56, fig 3.

d) At page 15, claim 1, applicant argues "Gupta does not mention the creation, use, or modification of sub-index"

As to the above argument [d], as best understood by the examiner, Gupta's B-tree structure allows for example to insert into child leaf information particularly value ranges associated with the leaf and one or more other leaves are revised, and additional leaves may be created under hierarchical B-tree structure [col 4; line 5-10], as

noted, sub-indexes are integral part of "B-tree" data structure particularly fig 3, element 300 because B-tree is arranged in hierarchical structure where each node or branch in the B-tree structure associated with specific index key as detailed in col 3, line 45-53; further it is noted that each index maintenance record includes a value for an index key ie., assigns to each of the plurality of index update [col 7, line 45-51, col 13, line 1-17].

e) At page 16, claim 1, applicant argues that "At no point in Blank's teachings are sub-indexes created or even mention. Thus, Blank fails to teach or suggest independently creating a plurality of sub-indexes"

As to the argument [e], as best understood by the examiner, Blank is directed to recover build index system in database records , particularly, building indexes , performing merge and sort operations [see Abstract, col 1, line 40-46]. Blank also teaches specific index build program in a database file operations, particularly structure of the index and file and partitions as detailed in col 2, line 53-55], it is also noted that Blank specifically teaches index key, record ids and their relation for scan, and sorting program as detailed in col 2, line 63-67, col 3, line 1-4], therefore, Blank "index system" operation has the ability to create independently multiple indexes and sub-indexes as detailed in col 3, line 25-31.

f) At page 17, applicant argues that neither Gupta nor Blank individually or in combination teach or suggest .....examiner has also not demonstrated sufficient motivation for one of ordinary skill in the art.....

In response to applicant's argument [f], that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Gupta is directed to parallel index maintenance, more specifically in a typical database system environment creating not only rows, column in a table, but also particularly creating "indexes" in order to improving the efficiency of data retrieval [see col 3, line 29-31], secondly, Gupta specifically teaches assigning "key" to the index i.e., assigning specific index IDs in a "B-tree" structure [see fig 3, col 3, line 45-56], thirdly, Gupta specifically teaches each index record corresponds to a row [see fig 6, col 12, line 28-36], i.e., index maintenance records where each index entry identified by "key value", further index maintenance records indicate changes that need to be made to indexes in response to changes that are made to the table [col 12, line 58-63] that corresponds to independently creating not only indexes having identified with index IDs, but also creating and maintaining "sub-indexes" and related records.

It is noted that Blank et al. is directed to recover/build index system, more specifically, building index in a database file in parallel to retrieve "key values" and their associated record identifier values [see Abstract], further Blank also specifically teaches various functions such as scan partitions, sort, merge the sort streams and building index using the merge streams [see fig 2, col 3, line 5-15].

It is however, noted that Gupta does not specifically teach 'merging the sub-indexes together to create, a final index related to the table', although Gupta specifically teaches coordinating an update of a global index of an indexed table and updates the global index using the current index maintenance record [col 7, line 41-42], further Gupta also suggests index maintenance records using "data manipulation operations among parallel data manipulation slaves for example fig 5, element 510, the data manipulation operations including updating col 14, line 46-47] , inserting, deleting [col 13, line 28] sorting [col 16, line 36-37]and like

On the other hand, Blank et al. disclosed 'merging the sub-indexes together to create, a final index related to the table' col 3, line 57-67, col 4, line 1-2], Blank specifically teaches index built system that supports multiple scan program performed in parallel by multiple processors against multiple partitions [see fig 3], further, in the processing or recover/built index system, multiple merge programs for example fig 4, element 112a-b are performed that merges all the key/rid values. Finally, an index built program 114 is performed to built final index element 116as detailed in fig 1.

It would have been obvious to one of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Blank et al. into parallel index maintenance of Gupta et al. because, both Gupta and Blank are directed to "multiple processors and multiple partitions of database tables [see Gupta fig 1, fig 7; Blank: fig 1, element 102 corresponds to multiple processors, element 120 corresponds to partition], both Gupta and Blank also teaches "indexing and index key [see Gupta: fig 2, col 13, line 26-40; Blank: col 2, line 42-48] and both Gupta and Blank specifically suggests "sort" operation [see Gupta: col 16, line 31-33; Blank: col 3, line 18-19] and both are from same field of endeavor.

One of the ordinary skill in the art at the time of applicant's invention to incorporate the teachings of Blank et al. into parallel index maintenance of Gupta et al. because that would have allowed user's of Gupta et al. .to use "sort program that executing in parallel receive the san streams for each "partition to create sort stream [col 3, line 5-9], while merge program that merges the sort stream received from the sort program to create a merge stream [col 3, line 10-15], further merge program built "final indexes" col 3, line 67, col 4, line 1-2] bring the advantages of "high performance recover/build index system that reduces the amount of time that takes to built index in multiple processors [col 3, line 25-27], furthermore, piping the data between the sort and merge programs improves performance of the system as suggested by Blank et al. [col 3, line 28-30],

Examiner applies above stated arguments to claims 14,18,20,24,27 and respective depend claims 2-13,15-17,19,21-23,25-26,28.

Therefore, Applicant's remarks are deemed not to be persuasive, and claims 1-28 stand rejected under 35 USC 103(a) as being unpatentable over Gupta et al in view of Blank et al.

Conclusion

The prior art made of record

a. US Patent. No. 6438562

b. US Patent No. 5842208

38. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Srirama Channavajjala whose telephone number is 571-272-4108. The examiner can normally be reached on Monday-Friday from 8:00 AM to 5:30 PM Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alam, Hosain, T, can be reached on (571) 272-3978. The fax phone numbers for the organization where the application or proceeding is assigned is 571-273-8300 Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free)

sc
Patent Examiner.
June 15, 2007.

SRIRAMA CHANNAVAJJALA
PRIMARY EXAMINER